

July 3, 2003

Federal Communications Commission
Washington, D.C.

Subject: Docket 03-104 (Broadband over Power Line)

Dear Commissioners:

As a Registered Professional Engineer, a Professor of Electrical Engineering, and a licensed Amateur Radio operator, I am very concerned about your apparent haste to permit the use of Broadband over Power Line (BPL) technology without sufficient study of its harmful effects to licensed radio services.

Overhead distribution-circuit lines used by electric power companies are excellent transmission lines at 60 Hz; at the frequencies to be used by BPL (2 to 80 MHz), these lines are very efficient antennas! The typical spacing between the conductors of an overhead distribution line is not a small fraction of a wavelength for frequencies between 2 and 80 MHz, and there is no practical way to avoid significant radiation at these frequencies.

If underground distribution cables are used rather than overhead lines to provide electric service, other problems with BPL are very likely to be encountered as clearly pointed out by McVey [1]. In addition, many electric utilities currently place little or no importance to tracking and eliminating harmful radio frequency interference (RFI) already generated by their systems. The history of the industry in this regard, along with the continued restructuring of electric utilities, virtually guarantees that RFI will increase significantly if BPL is implemented.

Many licensed users will be subjected to RFI caused by BPL systems, including Aeronautical, Maritime, Fixed and Mobile Services, Military, Broadcasting, and Amateur. This RFI will not only be local in nature - in the HF band (3-30 MHz), for example, sky-wave propagation will permit BPL in one location to generate harmful interference at hundreds and even thousands of miles away! The paper by Stott, Principal R&D Engineer for the BBC, on the cumulative effect of many BPL installations on distant receivers clearly points out that the possibility of interference to aircraft communications and navigation systems should be rigorously studied before implementing such a system [2].

The American Radio Relay League (ARRL) has demonstrated analytically that BPL systems operating at or near the current Part 15 limitations for radiated emissions can produce interference levels to nearby Amateur Radio stations which are as much as 70 dB above ambient noise levels [3]. Selective frequency notching provides only 30 dB or so of relief to the Amateur Radio

Service. Not only is 30 dB attenuation insufficient in general, this approach of providing some protection to specific frequencies rather than all frequencies is not in the public interest. In addition to the ARRL study, well-documented studies in Europe and Japan indicate that BPL causes harmful RFI to HF communications. In fact, Japan has refused to authorize the use of such systems at this time because of interference concerns and the Telecom Agency of the Dutch Government has abandoned its plans to deploy BPL after field studies demonstrated that the technology generates too much RFI.

In addition to the harmful interference caused by BPL systems, licensed radio services will almost certainly cause interference to BPL systems. For example, Amateur Radio operators will in many cases interfere with the unshielded BPL systems in their neighborhoods, even though the Amateurs will be operating entirely within the FCC's rules. The BPL users will not appreciate that the real problem lies within their system; they will only want the Amateurs to cease operating. The likelihood of having both angry BPL customers and angry Amateur Radio operators (and other licensees) throughout the nation is very high if the Commission permits this technology to be implemented.

Another serious drawback to BPL is the possible invasion of privacy. The radiated signals from BPL systems can be intercepted and decoded by people having the proper expertise and equipment. Possible abuses include theft of information and identity.

RECOMMENDATIONS

I strongly urge the Commission to change its mind about implementing BPL. If the Commission is determined to move forward with this technology, however, several suggestions are offered for your consideration:

1. Require all BPL systems to have unique "on the air" identifiers, similar to licensed radio stations having unique call signs. This requirement should help in tracking RFI sources caused by BPL.
2. Prohibit BPL operation below 30 MHz. In most cases this will minimize sky-wave propagation from BPL systems so that RFI will usually be "local" in nature.

Very truly yours,

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References

- [1] W. Lee McVey, P.E., "In the Matter of Inquiry Regarding Carrier Current Systems, including Broadband over Power Line Systems," comments filed to the FCC, ET Docket No. 03-104.
- [2] J.H. Stott, "Cumulative effects of distributed interferers," BBC R&D White Paper no. 004, available via: <http://www.bbc.co.uk/rd/pubs/whp/whp004.html>
- [3] Ed Hare, American Radio Relay League, "Calculated Impact of PLC on Stations Operating in the Amateur Radio Service," available via: <http://www.arrl.org/tis/infor/HTML/plc/files/C63NovPLC.pdf>